MICROVASCULAR DECOMPRESSION IN THE TREATMENT OF TRIGEMINAL NEURALGIA

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SUMMARY

There are many accepted surgical methods in the treatment of trigeminal neuralgia. Microvascular decompression is a widely used surgical approach, the purpose of which is to decompress the affected root entry zone of the fifth cranial nerve. It is highly effective in relieving pain and is associated with a low morbidity rate. In this paper we present nine cases of trigeminal neuralgia treated by microvascular decompression and discuss current therapeutical methods.

Key Words: Trigeminal neuralgia, Microvascular Decompression.

INTRODUCTION

Trigeminal neuralgia is characterized by the presence of paroxysmal attacks of pain in one or more of the sensory areas of the fifth cranial nerve. Since its first description in 1756, many drugs and surgical procedures have been used in its treatment (1,2). Today it is generally accepted that the preferred initial treatment should be medical (2,3). Surgery should be performed when pain is unresponsive to pharmacotherapy or in those cases where there is drug intolerance. Amongst the various surgical treatment methods available is microvascular decompression (MVD). This technique was pioneered by Gardner and Miklos (4,5) following Dandy's (6) observations, and was later popularized by Jannetta (7,8,9). It is one of the most commonly used therapeutical approaches. In this paper we present nine cases of trigeminal neuralgia which were treated by Jannetta's operation and discuss the indications of MVD.

MATERIALS AND METHODS

MVD was performed on nine cases of trigeminal neuralgia presenting to the Marmara University Hospital Department of Neurosurgery during the years of 1987 and 1988. (Table I)

Five of the patients were female and four male, their ages ranged from 34 to 71 years with a mean of 57 years. The duration of symptoms varied between 1 and 20 years with a mean of 6 years. In six cases pain was felt in one sensory division of the fifth cranial nerve, and in the remaining three patients in two sensory divisions of the nerve. All of the patients had previously undergone unsuccessful medical therapy and various surgical ablative procedures, as outlined in Table I. Under general anesthesia, retromastoid craniectomy in the lateral decubitus position (Jannetta's position) was performed, and the pontocerebellar angle was explored in all cases.

RESULTS

Following exposure of the trigeminal nerve, in all cases, we detected an arterial loop compressing the nerve at its root entry zone (REZ) and causing indentation in the nerve (Fig. 1a-i). The artery causing compression was dissected from the REZ with the aid of an operating microscope and microsurgical instruments. In all cases, an obvious groove was present in the nerve at the site of contact with the artery. After removal of the arterial loop, an autogenous muscle graft was placed between the artery and nerve. In one case, the trigeminal nerve appeared normal at the beginning of the procedure, but the arterial loop compressing the REZ was later visualised when the nerve was retracted using a microhook (Fig. 1a). In another patient, the petrosal vein lying over the trigeminal nerve was left intact because it was distant from the REZ. In this case, the accompanying arterial compression present at the REZ was removed (Fig. 1b).

Surgery was followed by relief of pain in all cases. Three patients had paresthetic complaints in the postoperative period. These complaints had disappeared at three months follow-up. Forth nerve paresis developed following surgery in one case but recovered spontaneously in the early postoperative period. Patients were followed up for a mean period of 16 months. During that time no recurrence of spasm occured. In this series no postoperative mortality or surgical infection was seen.

DISCUSSION

Because the pathophysiological mechanisms underlying trigeminal neuralgia are not clearly understood, many surgical approaches to treatment have been advocated. It is commonly agreed that pain is a result of REZ compression of the fifth cranial nerve (7,10,11).

Alcohol injection to the related branch of the trigeminal nerve is no longer used because of a high incidence of pain recurrence within 8-16 months (9).

Alcohol injection into the gasserian ganglion and various neurectomy methods such as peripheral neurectomy, Dandy's operation, Frazier's operation are no longer popular today because of their high morbidity rates (2,9). In his large review, Sweet (12) reported that these procedures cause deafferentation pain in up to 30% of patients and that patients have a significant risk of developing disturbing paresthetic complaints which may result in anesthesia dolorosa. Another important complication is visual loss as a possible result of neuroparalytic keratitis (12).

Trigeminal tractotomy is a procedure which consists of surgical interruption of the trigeminocephalic tract of the fifth nerve at the medullary level. Despite newly developed stereotactic methods, it may cause serious side effects such as analgesia in the ninth, tenth and second cervical sensory areas, loss of pain and temperature sensation on the opposite side, and ipsilateral proprioceptive loss (9,12).

One of the most commonly performed methods is glycerol injection into the retrogasserian cistern. This method was first introduced by Hakanson (1) in late 1970's but has lost popularity because of an associated yearly recurrence rate of 15-20% (13-16). Despite this, it is still used as the preferred method by some authors such as Arias (16,17).

Radiofrequency thermocoagulation (RF) is another popular interventional technique in modern trigeminal neuralgia treatment (18,19). Sweet (2) and Kanpolat (18) emphasize the ease of application with no necessity for long hospitalization and its recurrence rate of 20% with no mortality. 5% of cases develop paresthetic complaints and there is a 2% risk of anesthesia dolorosa (20,21). When compared with RF, MVD has no risk of anesthesia dolorosa or paresthetic complaints due to deprivation.

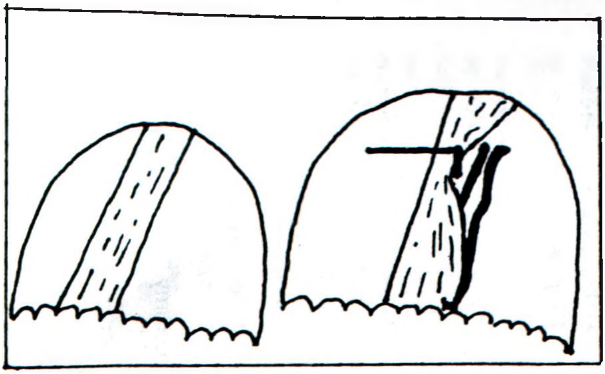
The success rate of MVD is between 78 and 91% in different large series (22-25). Jannetta (26) states that 80% of patients will have persistent relief and that satisfactory but incompelete relief will occur in 10%. Burchiel (27) has pointed out that these large series have a follow-up period of three years or less, and with the popularization of MVD, some new series with longer follow-up periods reveal a 1,5-3,5 % recurrence rates for each postoperative year. Apfelbaum (28) and Adams (23) have emphasized the fact that if at surgery arterial compression is not obvious, the risk of recurrence of pain is increased over those cases where definite nerve compression is seen. Furthermore there is a higher rate of faiure to relieve symptoms in these cases(7,28). In case of veneous compression of the REZ, the recurrence rate is significantly higher than where arterial compression occurs and may reach 43% (7,27). Barba et al (29) observed that a previous destructive procedure to the trigeminal nerve decreased their success rate following MVD from 91% to 43%.

The results in our patients are compatible with those described in the literature and we observed no persisting neurological deficits or mortality.

Following the development of microsurgical techniques, MVD now has an even lower morbidity and mortality and gives a very high cure rate. Because prior unsuccessful treatment with an ablative procedure precludes a good result following later treatment with MVD, MVD should be the first surgical approach in patients unresponsive to medical therapy where there is no contrindication to major surgery.

Table I : Clinical features and previous therapy of the cases.

AGE	SEX	DURATION OF COMPLAINTS	LOCALIZATION	PREVIOUS THERAPY
70	F	1,5 years	Right 5/2-3	Glycerol injection
46	F	10 years	Left 5/2-3	2 times RF
71	F	20 years	Right 5/3	4 times RF, alcohol inj.
51	F	1 year	Right 5/2	Alcohol inj., periph. neurectomy
52	M	1,5 years	Left 5/2-3	RF, 4 times alcohol inj.
34	M	4 years	Right 5/3	Glycerol inj.
63	F	2 years	Left 5/3	RF, alcohol inj.
61	M	8 years	Right 5/1	Alcohol inj.
68	M	6 years	Right 5/3	RF



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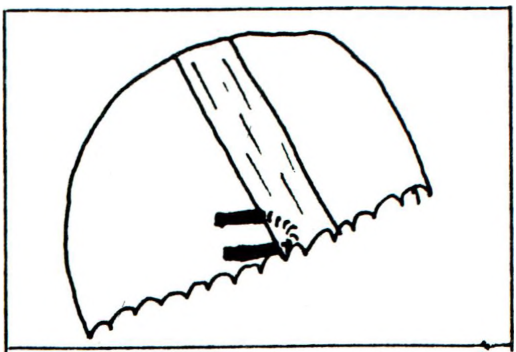

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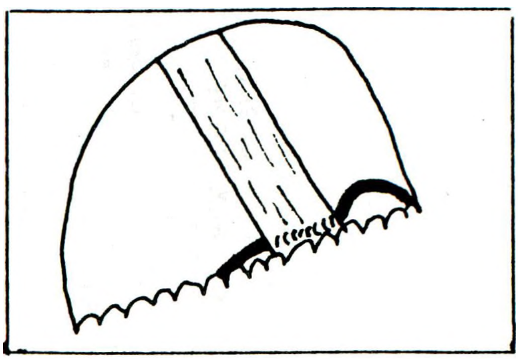

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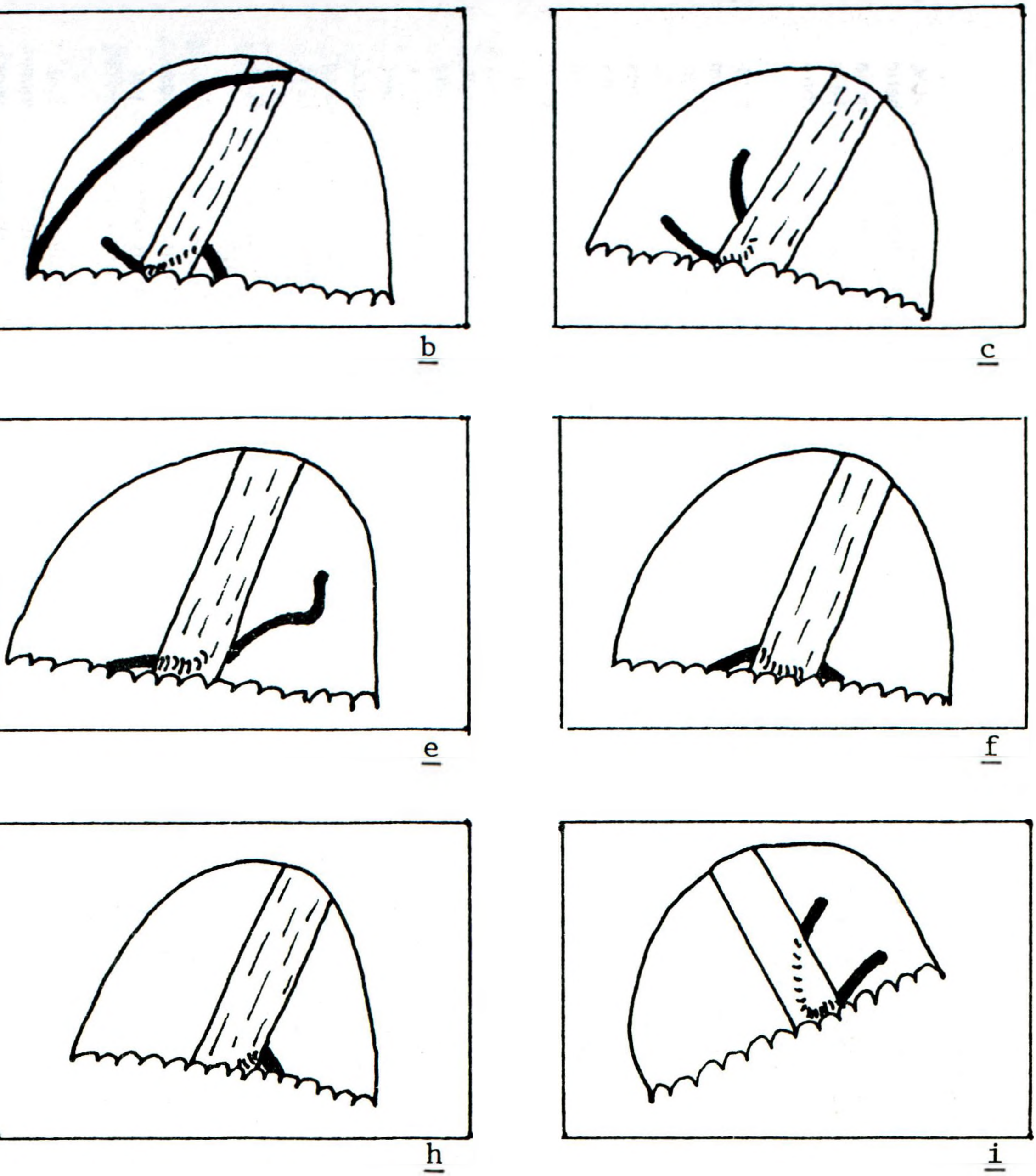

Figure 1 (a-i) : Different types of REZ compression detected during surgery.

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